STANDARDS

CORNER BLOCKS, SIZE AND CUTTING PROCEEDURE

RIP SHEET OF 1/4" PLYWOOD INTO 7 STRIPS THAT ARE 6 3/4" WIDE. ALLOWING AN 1/8" FOR EACH SAW KERF THERE SHOULD BE NO WASTE.

STACK 3 OR 4 STRIPS TOGETHER. USE A 45° ANGLE JIG ON THE RADIAL SAW. SET STACK INTO PLACE AS SHOWN IN FIG 1. MAKE FIRST CUT AND THROW AWAY THE FIRST STACK OF TRIANGLES. (THE GRAIN IS THE WRONG DIRECTION IN THE FIRST STACK.)

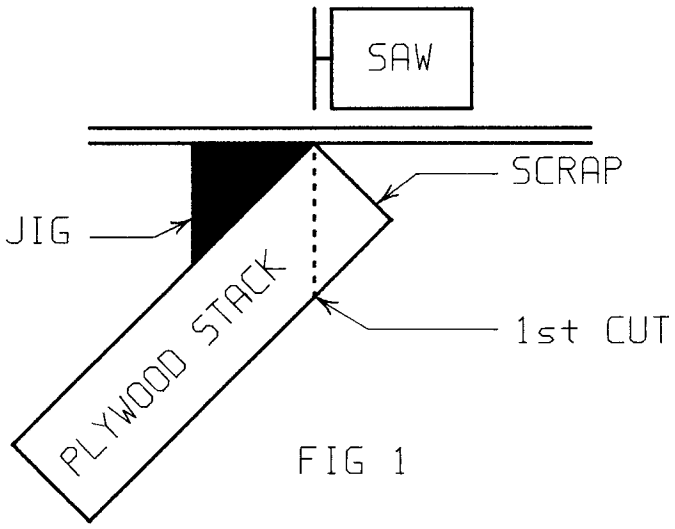


FIG 1

FLIP THE STACK OVER AND PLACE THE FIRST CUT ALONG THE FENCE OF THE RADIAL SAW, AS SHOWN IN FIG 2. MAKE THE SECOND CUT.

CONTINUE FLIPPING THE STACK OVER AND CUTTING UNTIL ALL USABLE CORNER BLOCKS HAVE BEEN CUT.

THROW AWAY ANY CORNER BLOCKS THAT HAVE CONTINUOUS VOIDS.

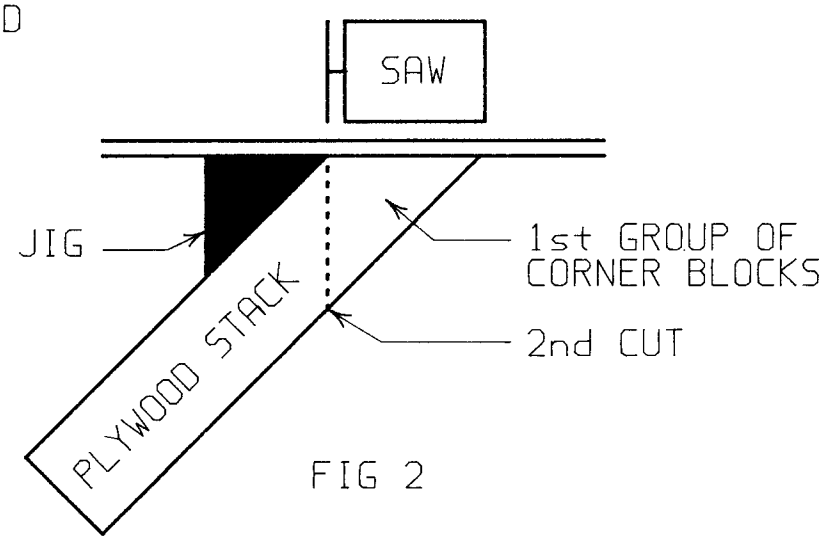


FIG 2

CHAMFER THE FACE EDGES OF EACH CORNER BLOCK ON THE BENCH SANDER.

STANDARDS

KEYSTONES, SIZE AND CUTTING PROCEEDURE

RIP 1/4" PLYWOOD STRIPS THAT ARE 2 3/4" WIDE. STACK 3 OR 4 STRIPS TOGETHER AND CUT TO 7" LENGTHS ON THE RADIAL SAW. THROW AWAY ANY KEYSTONES THAT HAVE CONTINUOUS VOIDS. CHAMFER THE TOP EDGES OF EACH KEYSTONE ON THE BENCH SANDER.

BRACE STRAPS, SIZE AND CUTTING PROCEEDURE

RIP 1/4" PLYWOOD INTO 1 1/2" STRIPS. (BRACES SHOULD BE 1 3/4" WIDE.)

USE A 45° ANGLE JIG ON THE RADIAL SAW. STACK 3 OR 4 PLY STRIPS TOGETHER AND PLACE ON THE JIG AS SHOWN IN FIG 3.

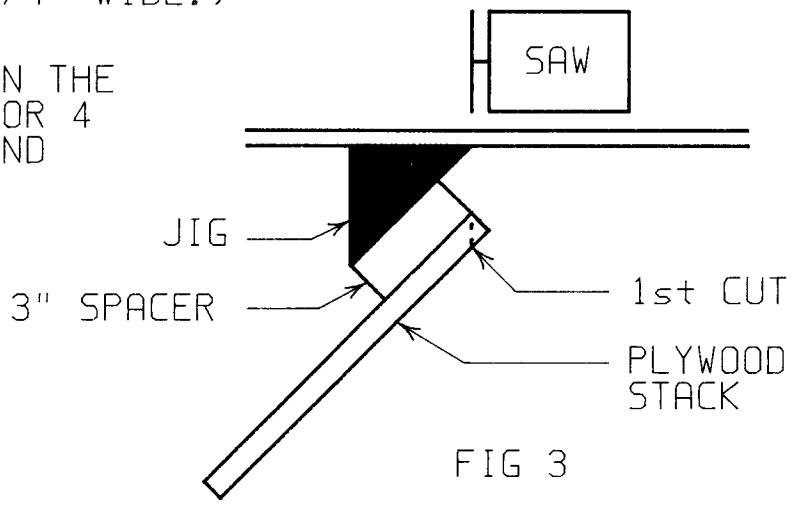


FIG 3

FLIP STACK AFTER 1st CUT AND SLIDE STACK AGAINST FENCE AS SHOWN IN FIG 4. THE 1×3 SPACER AND FENCE WILL DETERMINE BRACE STRAP LENGTH.

CONTINUE FLIPPING THE STACK OVER UNTIL ALL USABLE BRACE STRAPS HAVE BEEN CUT.

THROW AWAY ANY BRACE STRAPS THAT HAVE CONTINUOUS VOIDS.

CHAMFER THE TOP EDGES OF EACH STRAP ON THE BENCH SANDER.

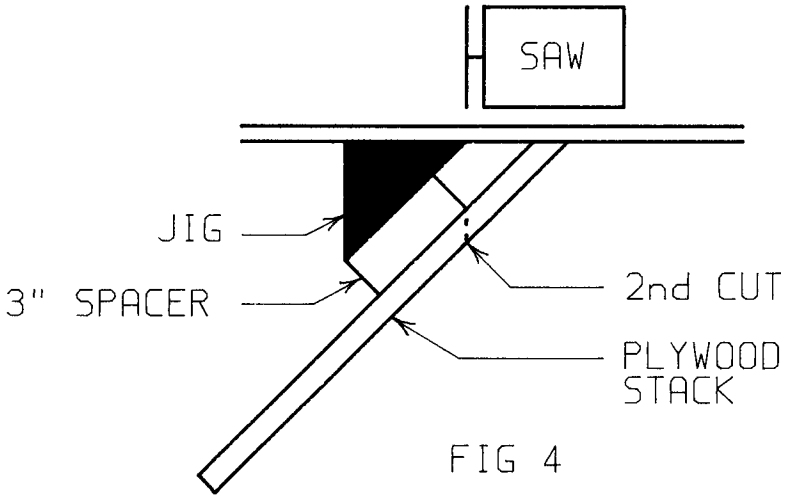


FIG 4

STANDARDS

VARIATIONS IN CONSTRUCTION OF FLATS

FLAT CONSTRUCTION (FIG 1)

FLAT CONSTRUCTION IS GENERALLY USED WHEN FLATS ARE TO BE COVERED WITH FABRICS SUCH AS MUSLIN, DUCK, FRP, OR VELOUR. THIS IS SOMETIMES REFERRED TO AS A THEATER FLAT OR THEATRIC CONSTRUCTION.

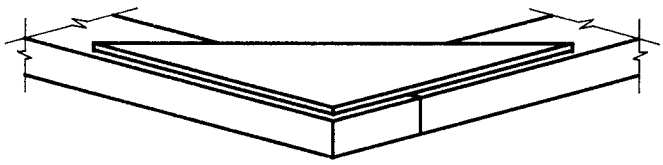


FIG 1

SOMETIMES, THEATER FLATS MAY BE COVERED WITH PLYWOOD OR LAUAN FOR SPECIAL APPLICATIONS.

ON EDGE CONSTRUCTION (FIG 2)

ON EDGE CONSTRUCTION IS USED WHEN FLATS ARE COVERED WITH HARD MATERIALS SUCH AS PLYWOOD OR LAUAN. THIS TYPE OF FRAMING PROVIDES A MORE RIGID STRUCTURE TO PREVENT THE PLYWOOD FROM WARPING. ON EDGE CONSTRUCTED FLATS ARE USUALLY REFERRED TO AS TV FLATS.

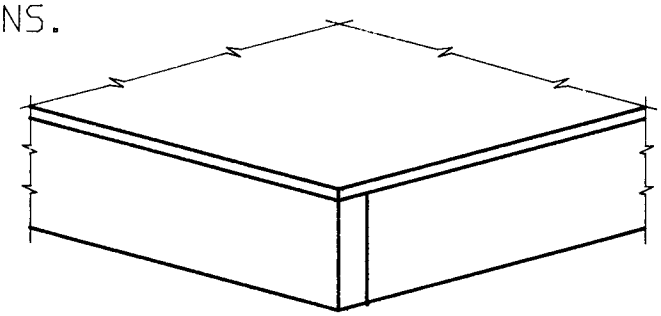


FIG 2

PROFILE FLATS (FIG 3)

PROFILE PLATS ARE USUALLY FLAT CONSTRUCTION WITH PLYWOOD PROFILES AROUND THE PERIMETER. RUN FRAMING AS CLOSE TO THE EDGE AS POSSIBLE. ADD ADDITIONAL BLOCKING AT EXTREEM OVERHANGS. IF FLATS ARE COMPLETELY PLY COVERED THE BRACES CAN BE ELIMINATED.

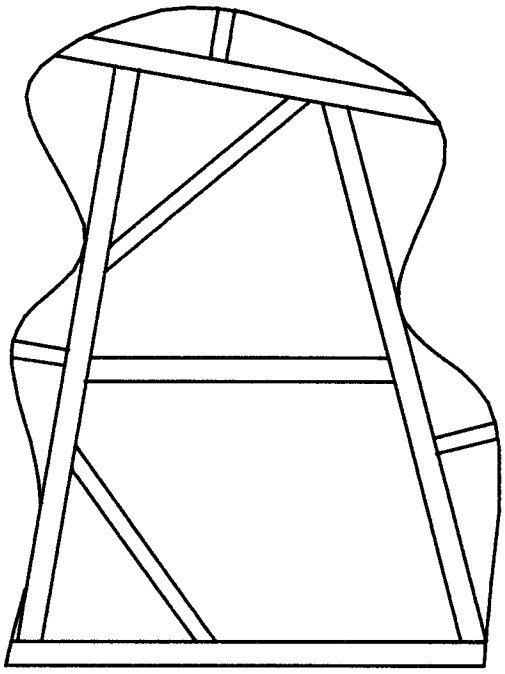
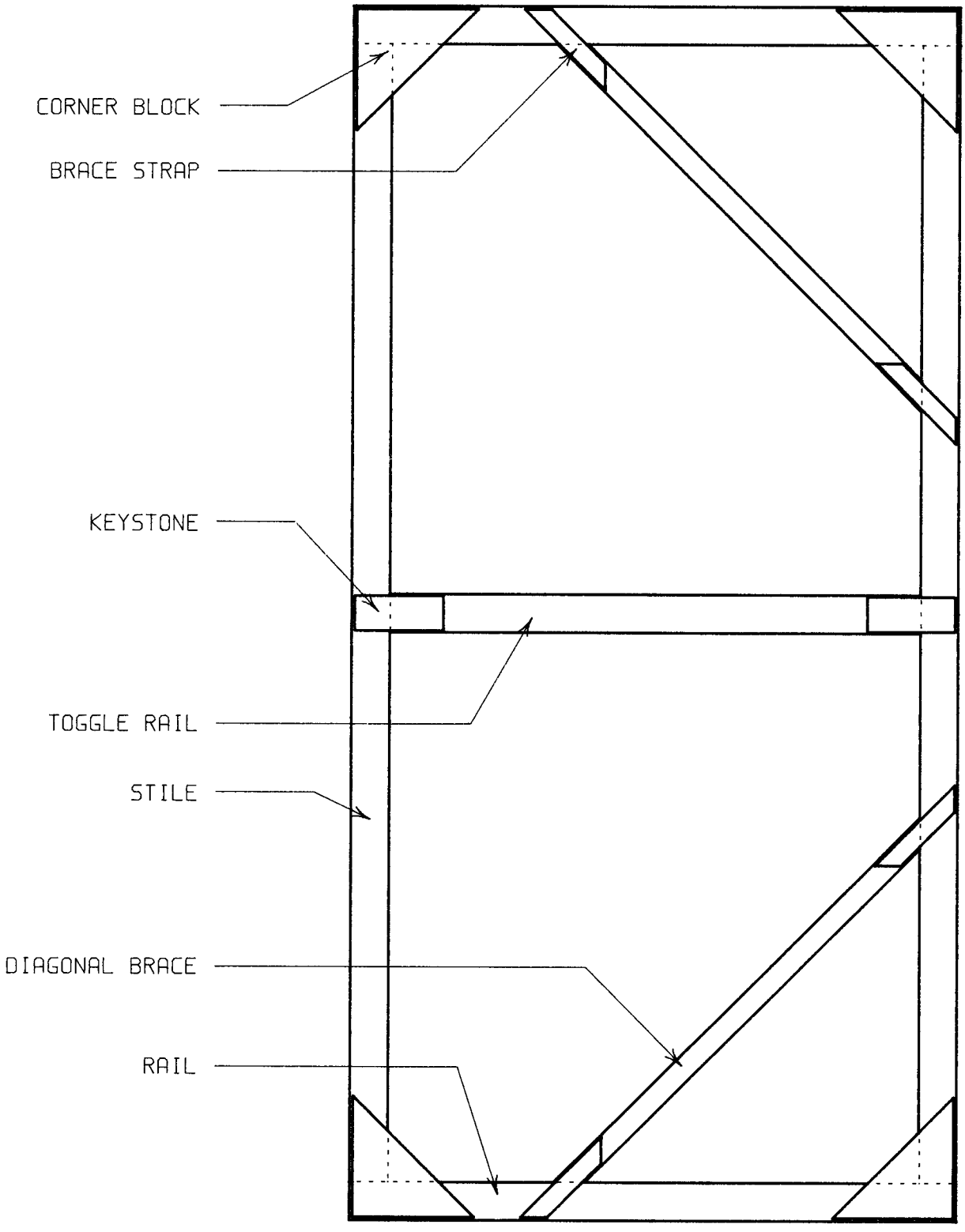


FIG 3

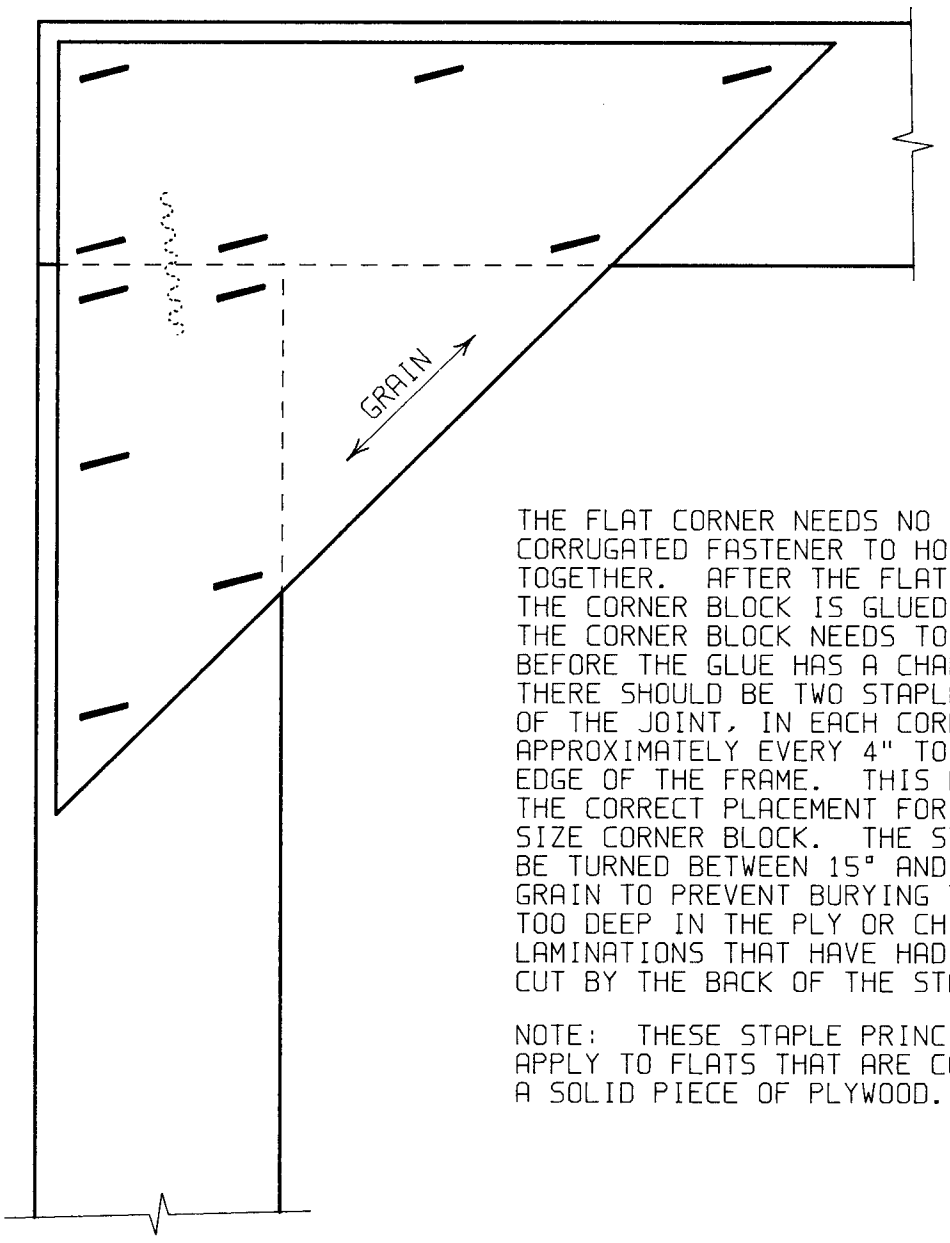
STANDARDS

PARTS OF A FLAT



STANDARDS

RAIL AND STILE CONNECTION

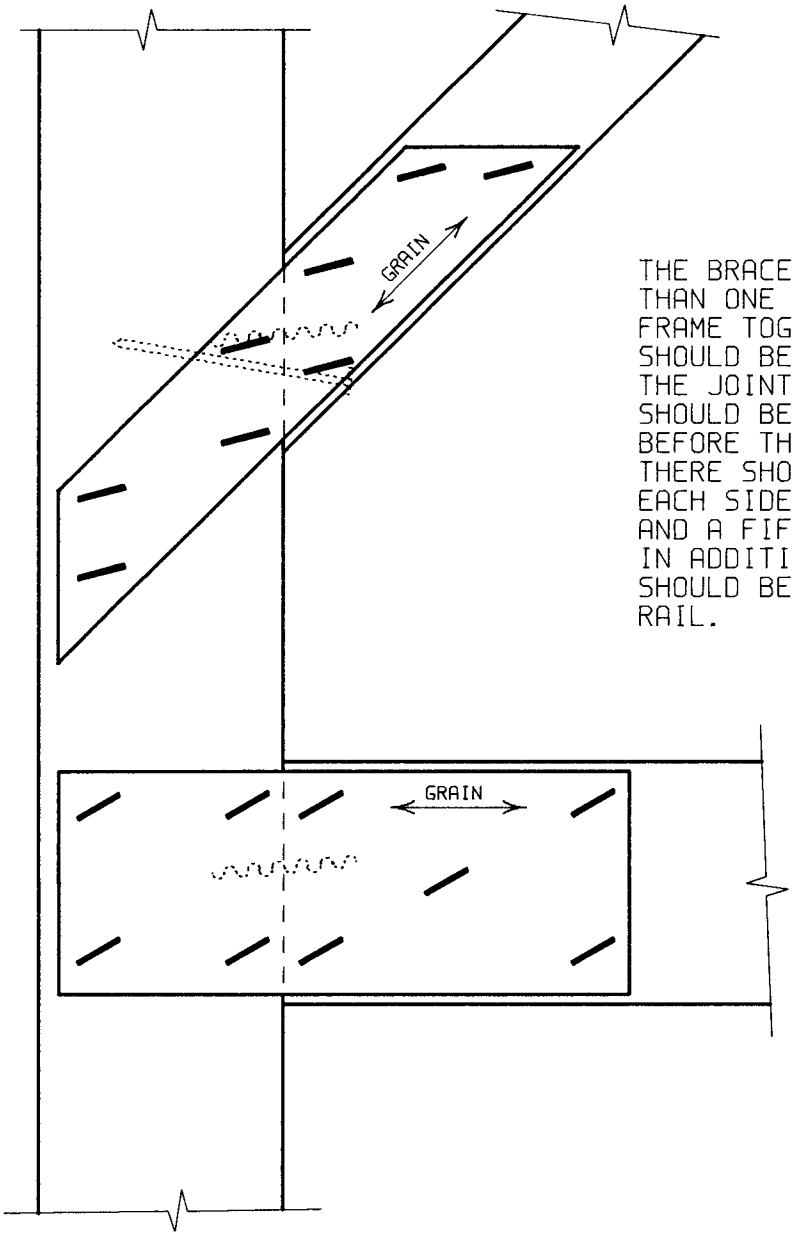


THE FLAT CORNER NEEDS NO MORE THAN ONE CORRUGATED FASTENER TO HOLD THE JOINT TOGETHER. AFTER THE FLAT IS SQUARED, THE CORNER BLOCK IS GLUED TO THE FLAT. THE CORNER BLOCK NEEDS TO BE STAPLED BEFORE THE GLUE HAS A CHANCE TO SET. THERE SHOULD BE TWO STAPLES ON EACH SIDE OF THE JOINT, IN EACH CORNER AND APPROXIMATELY EVERY 4" TO 6" ALONG EACH EDGE OF THE FRAME. THIS DIAGRAM SHOWS THE CORRECT PLACEMENT FOR A STANDARD SIZE CORNER BLOCK. THE STAPLES SHOULD BE TURNED BETWEEN 15° AND 30° FROM THE GRAIN TO PREVENT BURYING THE STAPLES TOO DEEP IN THE PLY OR CHIPPING UP LAMINATIONS THAT HAVE HAD THEIR GRAIN CUT BY THE BACK OF THE STAPLE.

NOTE: THESE STAPLE PRINCIPLES ALSO APPLY TO FLATS THAT ARE COVERED WITH A SOLID PIECE OF PLYWOOD.

STANDARDS

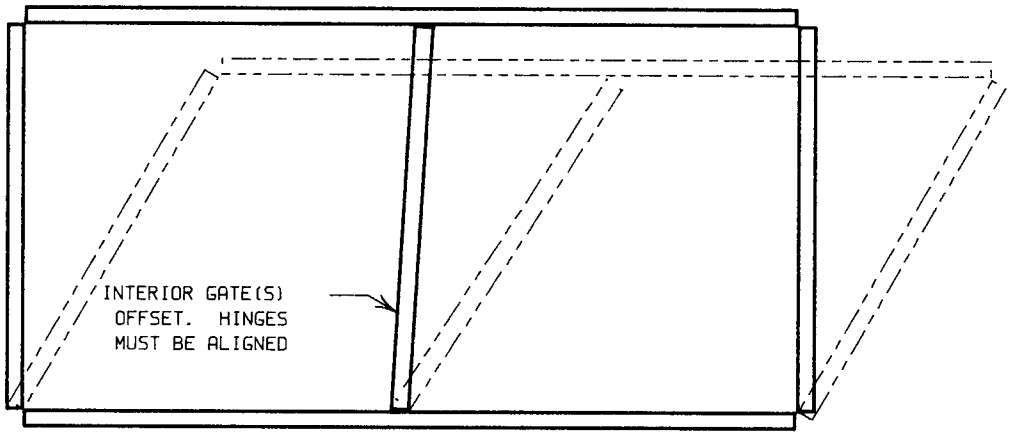
BRACE AND TOGGLE RAIL CONNECTIONS



THE BRACE AND TOGGLE RAIL NEED NO MORE THAN ONE CORRUGATED FASTER TO HOLD THE FRAME TOGETHER. THE CORRUGATED FASTENER SHOULD BE APPROXIMATELY 80° TO 90° FROM THE JOINT. THE BRACE STRAP AND KEYSTONE SHOULD BE APPLIED WITH GLUE AND STAPLED BEFORE THE GLUE HAS A CHANCE TO SET. THERE SHOULD BE AT LEAST TWO STAPLES ON EACH SIDE OF THE JOINT, ONE IN EACH CORNER AND A FIFTH STAPLE IN THE TOGGLE RAIL. IN ADDITION TO THE BRACE STRAP THE BRACE SHOULD BE EDGE NAILED INTO THE STILE AND RAIL.

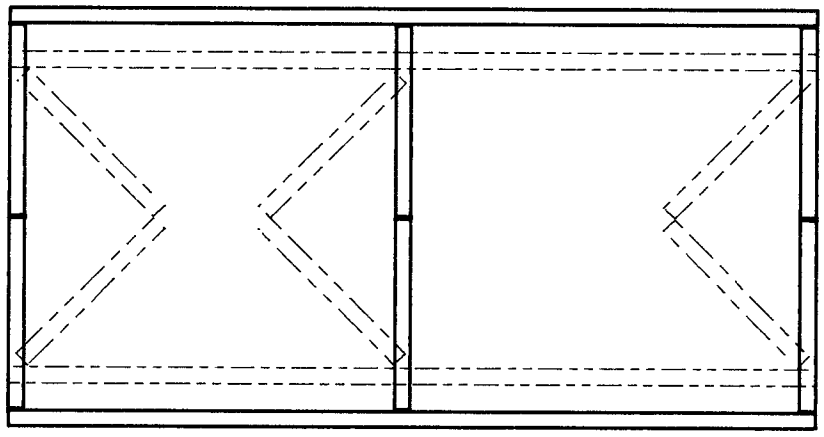
STANDARDS

AMERICAN STYLE PARALLEL



AMERICAN STYLE PARALLELS USE FEWER FRAMES THAN EUROPEAN PARALLELS OF THE SAME SIZE. HOWEVER, THEY USUALLY REQUIRE MASKERS TO HIDE THE FRAMES ESPECIALLY BECAUSE OF THE WAY THE CORNERS OVERLAP. THE INTERIOR FRAME(S) MUST BE OFFSET IN ORDER TO PROPERLY ALIGN THE HINGES FOR FOLDING. THE FOLDED LENGTH IS APPROXIMATELY EQUAL TO THE LENGTH PLUS WIDTH. PERIMETER FRAMES MUST BE PARALLEL.

EUROPEAN STYLE PARALLEL

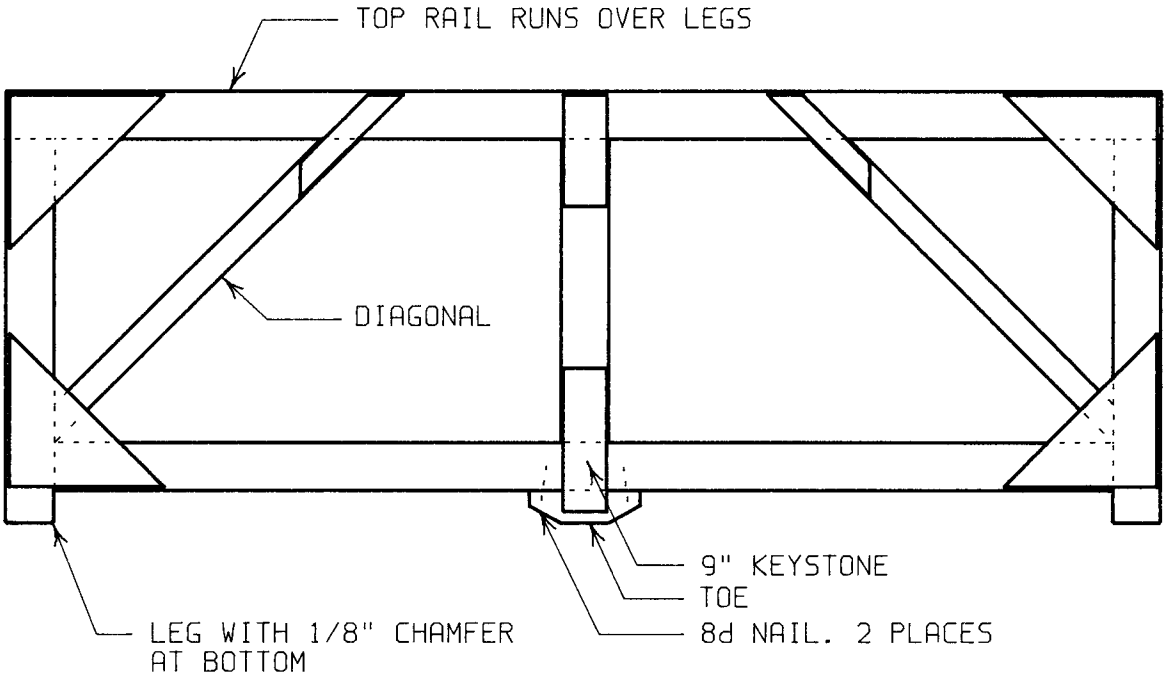


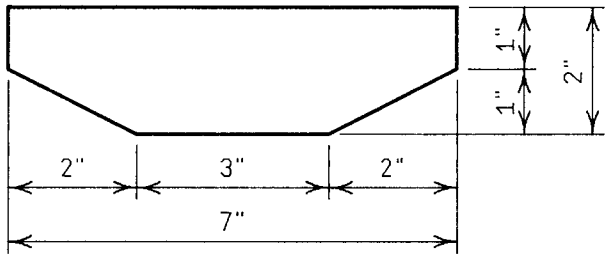
EUROPEAN STYLE PARALLELS USE MORE FRAMES THAN AMERICAN PARALLELS OF THE SAME SIZE. HOWEVER, BECAUSE THE CORNERS OVERLAP THE FRAMES CAN BE COVERED WITH PLYWOOD AND USED AS MASKERS. THE INTERIOR FRAME(S) MUST BE POSITIONED TO ALLOW THEM TO FOLD. MANY TIMES AN INTERIOR FRAME WILL HAVE TO BE REMOVED IN ORDER TO FOLD THE PARALLEL. THE FOLDED LENGTH IS THE SAME AS THE OPENED LENGTH. THE PERIMETER FRAMES MUST DEFINE A RECTANGLE.

MANY TIMES IT IS BETTER TO BUILD PARALLEL FRAMES AND LOOSE PIN HINGE THEM TOGETHER. THIS ALLOWS FOR NON-PARALLEL CONFIGURATIONS AND TO TAKE ADVANTAGE OF THE COST SAVING FEATURES OF EACH STYLE OF PARALLEL.

STANDARDS

PARALLELS





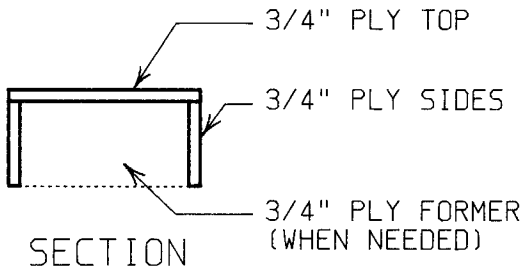
TOE DETAIL

PARALLEL FRAMES ARE CONSTRUCTED SIMILAR TO THEATER FLATS. ALL THE STANDARDS THAT APPLY TO CORNER BLOCKS, KEYSTONES AND BRACE STRAP JOINTS APPLY TO PARALLEL FRAMES. PARALLEL FRAMES ARE TYPICALLY CALLED "GATES" OR FRAMES TO DISTINGUISH THEM FROM FLATS.

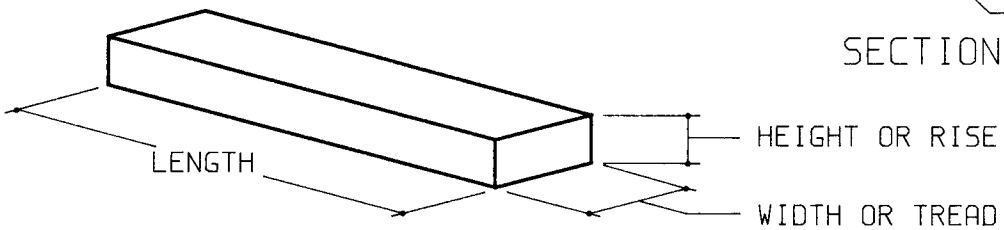
THE BOTTOM RAIL OF A PARALLEL GATE IS RAISED 2" ABOVE THE FLOOR AND THE LEGS REST DIRECTLY ON THE FLOOR. THE INTERIOR LEG (OR LEGS) REST ON THE BOTTOM RAIL AND TOE. THE TOE IS GLUED TO THE BOTTOM RAIL AND HELD WITH ONE CORRUGATED FASTENER, A 9" KEYSTONE AND IS ALSO EDGE NAILED INTO THE BOTTOM RAIL.

STANDARDS

1-STEP CONSTRUCTION



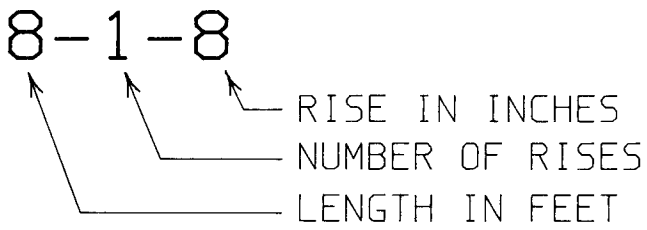
SECTION



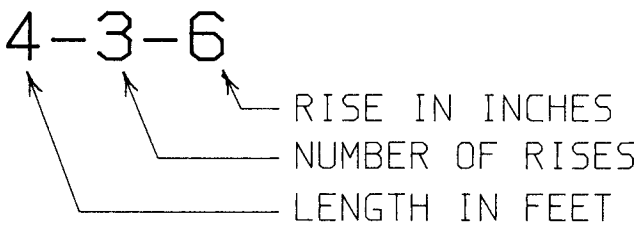
ISOMETRIC

TYPICAL RENTAL STEP HAS A 12" TREAD AND 6" OR 8" RISE.
STEP UNIT IS CONSTRUCTED ENTIRELY FROM 3/4" PLYWOOD.
ENDS = WIDTH × (RISE - 3/4")
FRONT AND BACK = (LENGTH - 1 1/2") × (RISE - 3/4")
TOP = LENGTH × WIDTH

STAIR LABELING



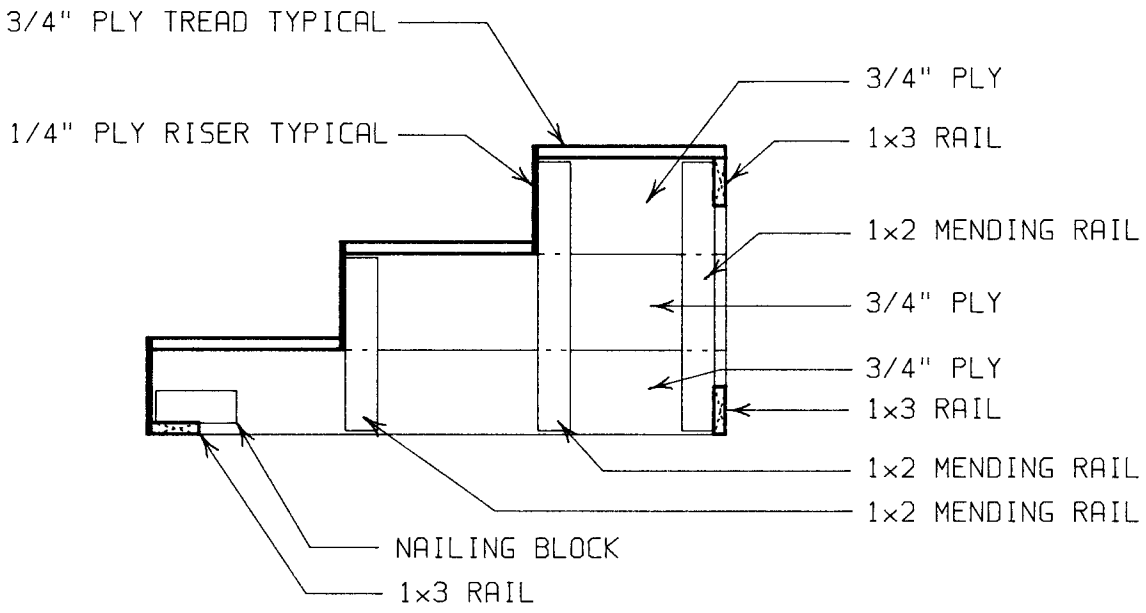
THIS WOULD INDICATE A STEP THAT WAS 8' LONG, HAD 1 RISE THAT WAS 8" HIGH. IT COULD BE USED WITH A PLATFORM THAT WAS EITHER 8" OR 16" HIGH.



THIS WOULD INDICATE A STEP UNIT THAT WAS 4' LONG, HAD 3 RISES THAT WERE 6" HIGH EACH. THE OVERALL HEIGHT IS 3 × 6" = 18" THIS STEP COULD BE USED WITH AN 18" OR 24" PLATFORM.

STANDARDS

MULTI-RISE STEP CONSTRUCTION



SECTION THROUGH 3-STEP

TYPICAL RENTAL MULTI-RISE STEPS ARE 4' LONG WITH EITHER A 6" OR 8" RISE. THIS STYLE OF CONSTRUCTION IS USUALLY USED UP TO 5 STEPS. IF MORE STEPS ARE REQUIRED, USE A DIFFERENT STYLE OR USE MULITPLE STEP UNITS WITH THE HIGHER RISES SITTING ON RENTAL DECKS.

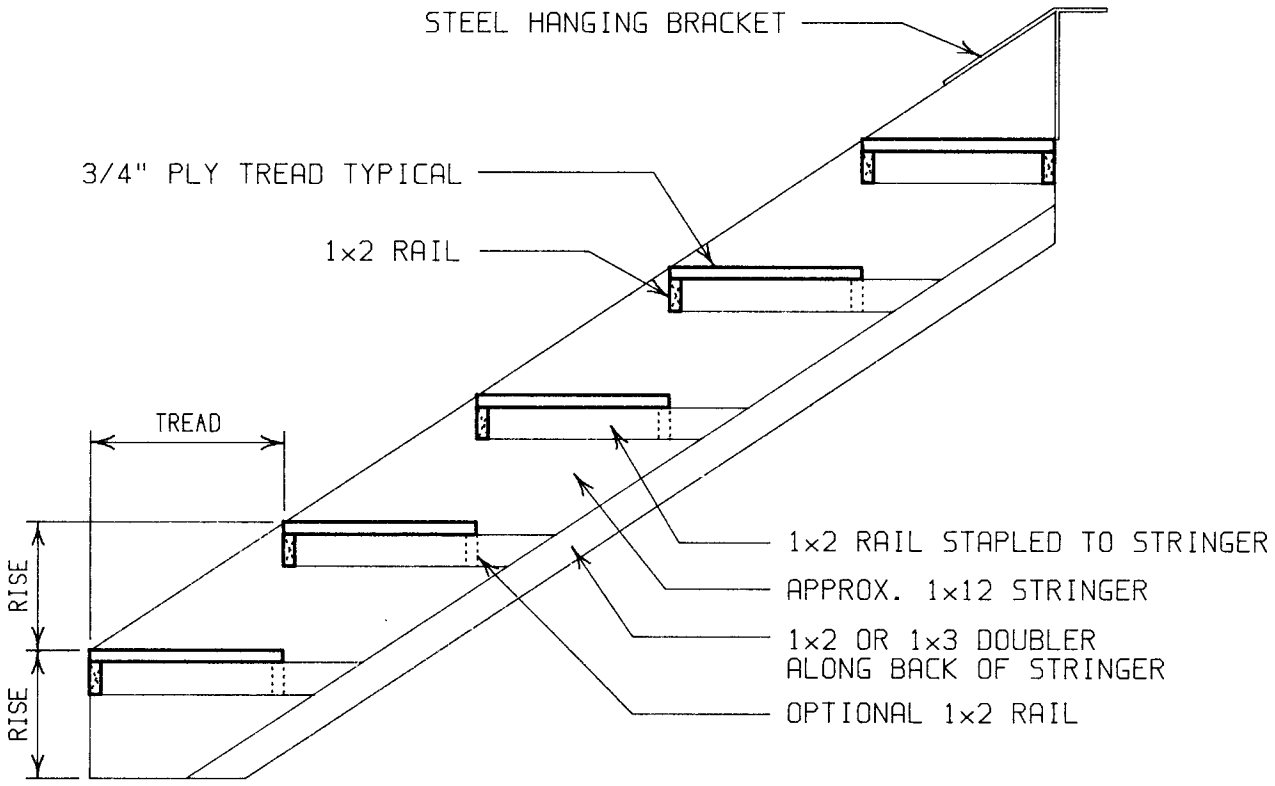
STAIR STRINGERS ARE CONSTRUCTED WITH STRIPS OF 3/4" PLYWOOD CLEATED TOGETHER WITH 1x2 MENDING RAILS. IN THE EXAMPLE ABOVE THE SIZES ARE AS FOLLOWS:

- LOWEST PLY STRIP = (3 TREADS - 1/4") x (RISE - 3/4")
- MIDDLE PLY STRIP = (2 TREADS - 1/4") x RISE
- TOP PLY STRIP = (TREAD - 1/4") x RISE
- ALL TREADS = (TREAD - 1/4") x LENGTH
- BOTTOM RISER = RISE x LENGTH
- ALL OTHER RISERS = (RISE + 3/4") x LENGTH
- 1x3 RAILS = LENGTH - 1 1/2"

ON STAIRS WITH 4 OR MORE RISERS, A DIAGONAL BRACE SHOULD BE ADDED AT THE BACK TWO RAILS.

STANDARDS

SHIP'S LADDER



SECTION THROUGH SHIP LADDER

THE TREADS OF A SHIP'S LADDER ARE 3/4" PLYWOOD ON 1x2 FRAMING. THE END FRAMING RUNS BACK TO THE DOUBLER ALONG THE BACK OF THE STRINGER. THIS CONSTRUCTION TECHNIQUE IS TO STRENGTHEN THE STRINGER. THE STEEL HANGING BRACKET SHOULD BE CONSTRUCTED SO IT CAN BE BOLTED TO THE SIDE OF THE STRINGER IN ADDITION TO EDGE ATTACHMENT. A HOLE IN THE STEEL HANGING BRACKET ALLOWS YOU TO SCREW IT TO THE PLATFORM, TO PREVENT IT FROM SLIPPING.

STANDARDS

JACKS

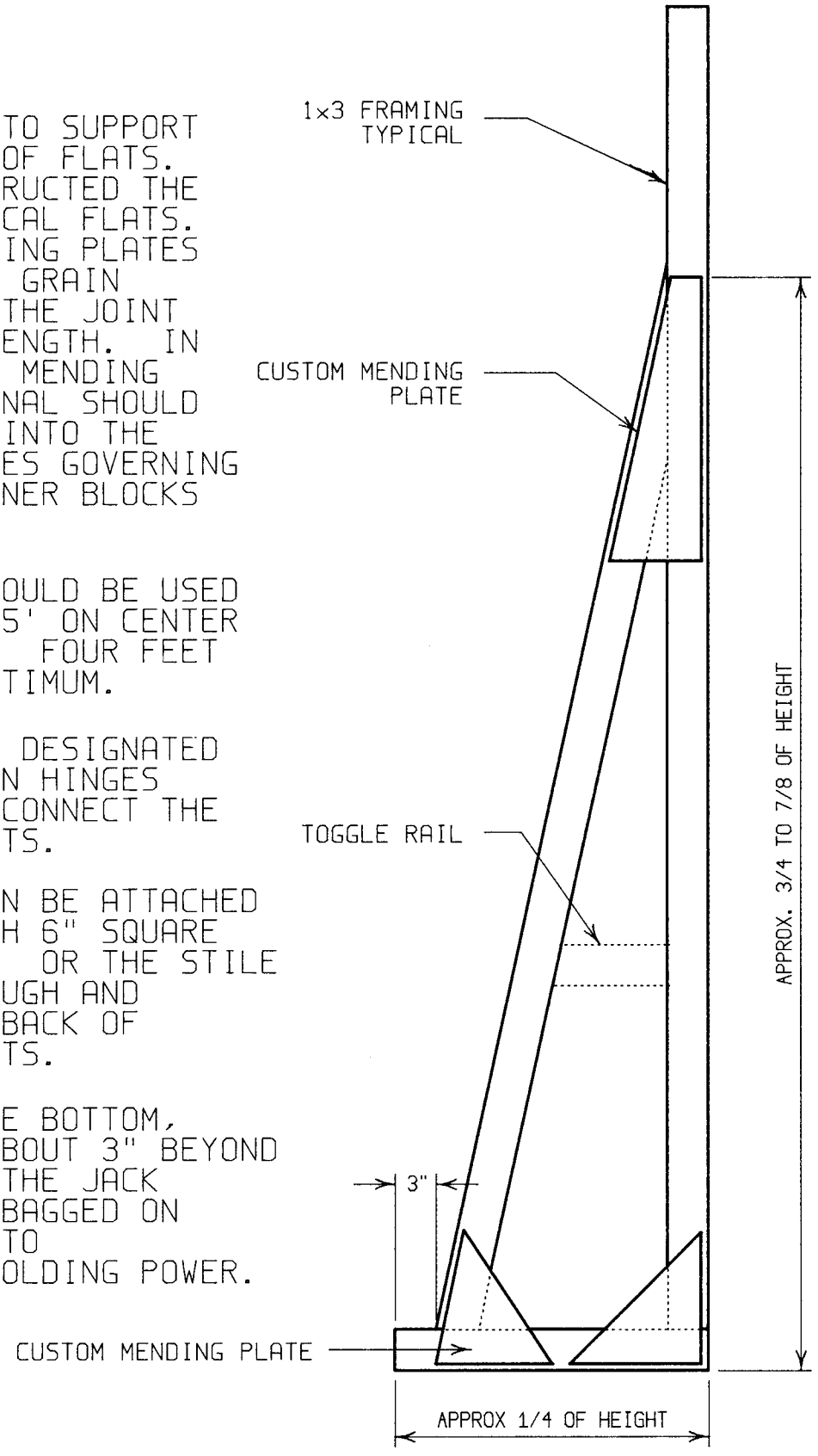
JACKS ARE USED TO SUPPORT VERTICAL WALLS OF FLATS. JACKS ARE CONSTRUCTED THE SAME AS THEATRICAL FLATS. THE CUSTOM MENDING PLATES MUST HAVE THEIR GRAIN RUNNING ACROSS THE JOINT FOR MAXIMUM STRENGTH. IN ADDITION TO THE MENDING PLATE THE DIAGONAL SHOULD BE EDGE NAILED INTO THE STILE. ALL NOTES GOVERNING STAPLING OF CORNER BLOCKS APPLY.

TOGGLE RAILS SHOULD BE USED AT LEAST EVERY 5' ON CENTER FOR TALL JACKS. FOUR FEET ON CENTER IS OPTIMUM.

ON SCENERY WITH DESIGNATED JACKS, LOOSE PIN HINGES MAY BE USED TO CONNECT THE JACK TO THE FLATS.

RENTAL JACKS CAN BE ATTACHED TO TV FLATS WITH 6" SQUARE MENDING PLATES. OR THE STILE CAN BE A HOGTROUGH AND SCREWED TO THE BACK OF THREATRICAL FLATS.

THE RAIL, AT THE BOTTOM, SHOULD EXTEND ABOUT 3" BEYOND THE DIAGONAL. THE JACK SHOULD BE SAND BAGGED ON THIS EXTENSION TO MAXIMIZE IT'S HOLDING POWER.



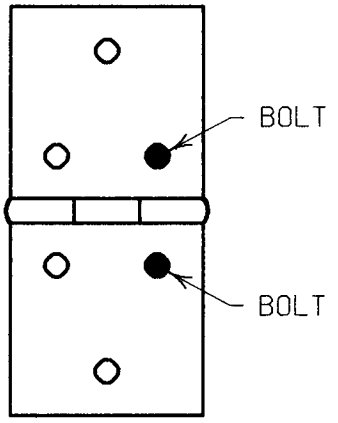
STANDARDS

BOLTING HARDWARE

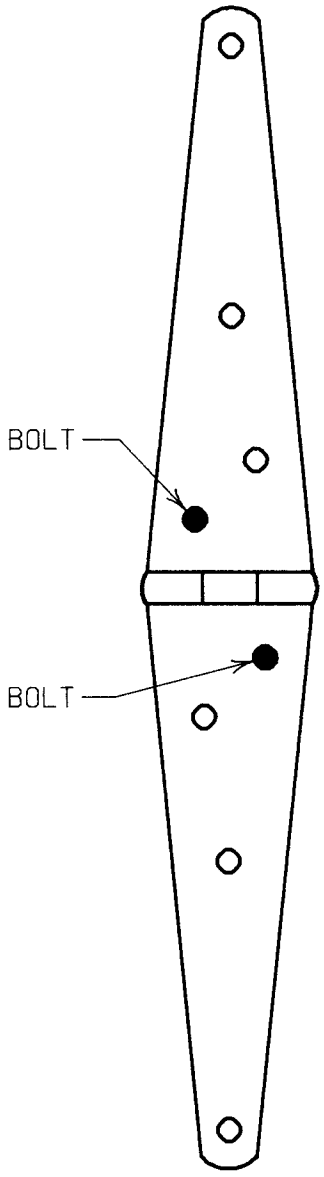
WHEN ATTACHING HARDWARE OR HINGES THAT WILL GET A LOT OF HANDLING OR WEIGHT, AS IN RIGGING HARDWARE, YOU NEED TO BOLT THE HOLE THAT IS CLOSEST TO THE WORK OR LOAD.

ON HINGES BOLT THE HOLE THAT IS NEAREST THE KNUCKLE.

ON HINGES, SUCH AS BACK FLAPS, WHERE THERE IS A CHOICE OF HOLES, PLACE THE BOLTS OPPOSITE FROM EACH OTHER.

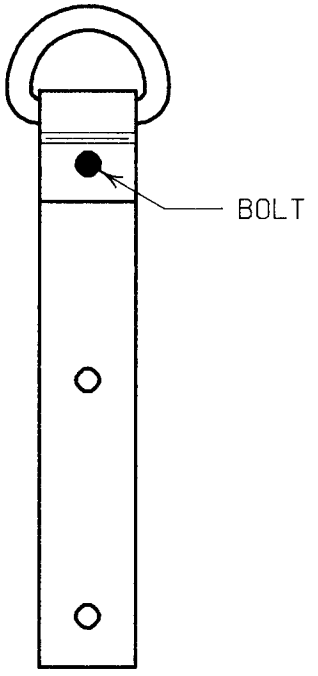


BACK FLAP HINGE



6" LIGHT STRAP HINGE

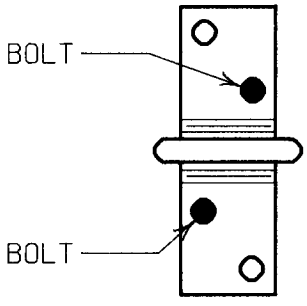
HANGING IRONS NEED AT LEAST ONE BOLT AT THE RING. THE OTHER TWO HOLES MAY NEED TO BE BOLTED AS THE LOAD INCREASES.



HANGING IRON

DEE RING PLATES SHOULD HAVE ONE BOLT ON EACH SIDE OF THE DEE RING.

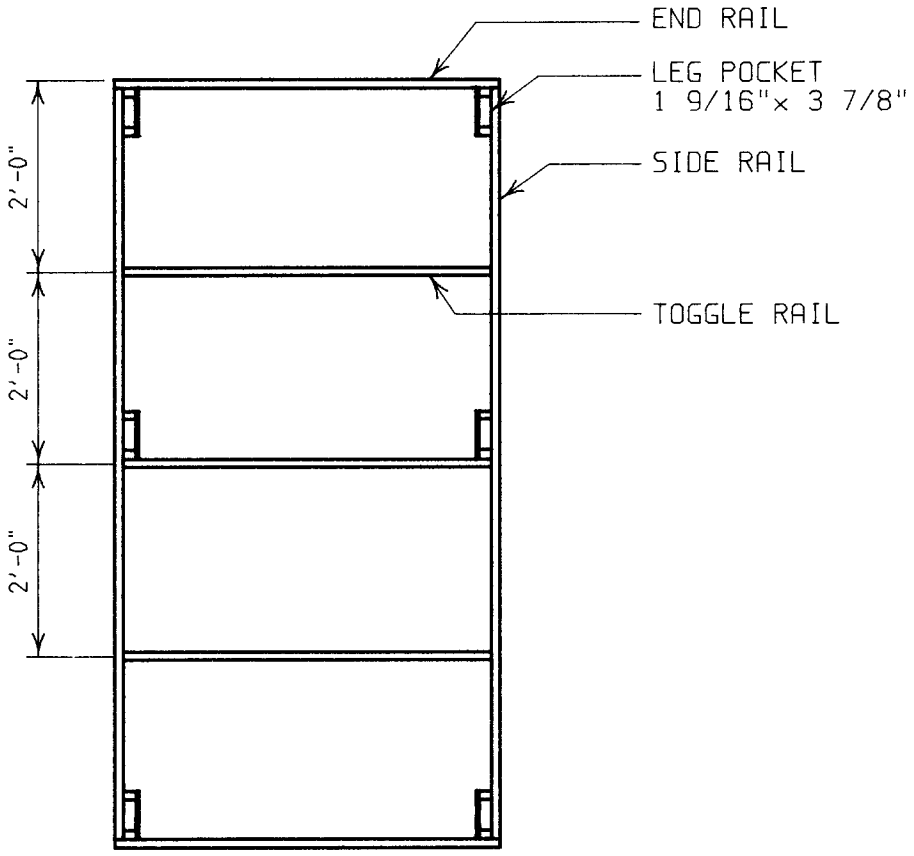
ALL OTHER HOLES SHOULD HAVE THE APPROPRIATE SIZED SCREWS.



DEE RING PLATE

STANDARDS

RENTAL PLATFORM CONSTRUCTION

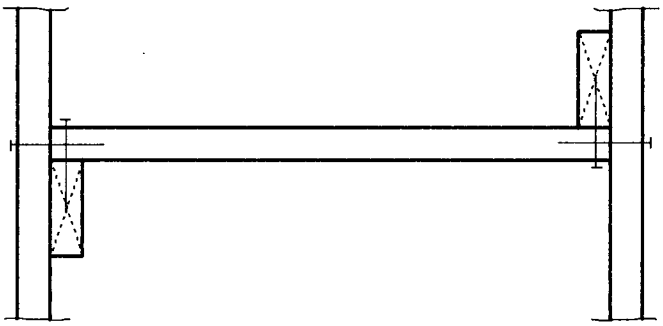


RENTAL DECKS ARE CONSTRUCTED OF 1 1/16"× 3 1/4" POPLAR SKINNED WITH 3/4" AC PLYWOOD. STANDARD RENTAL DECK SIZES SHOULD HAVE 3/8" ALUMINUM LEG POCKET PLATES. (SEE STANDARDS/PLATES) TOGGLE RAILS ARE ALWAYS 2' ON CENTER FROM THE TOP END. THIS IS TO STANDARDIZE LEG POSITIONS. FOR MORE DETAILED CONSTRUCTION DRAWINGS ABOUT CONSTRUCTION AND SET-UP REFER TO "FM RENTAL PLATFORM STRUCTURE" DATED 3-7-90.

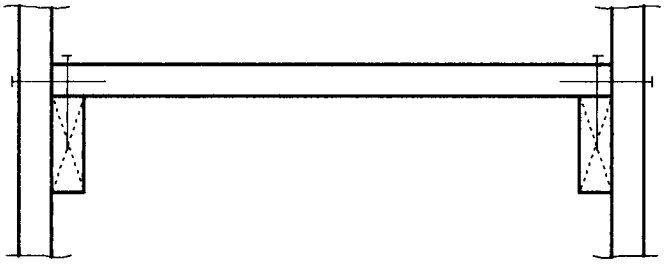
STANDARDS

NAILING BLOCKS

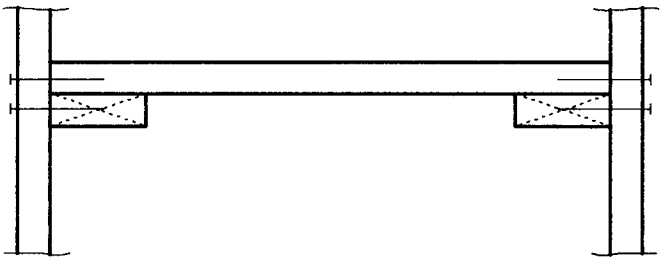
BEST PATTERN
MOST RESISTANCE TO TWISTING FORCES.
OFFERS CROSS NAILING.



GOOD PATTERN
OFFERS SOME RESISTANCE TO TWISTING FORCES.
OFFERS CROSS NAILING.



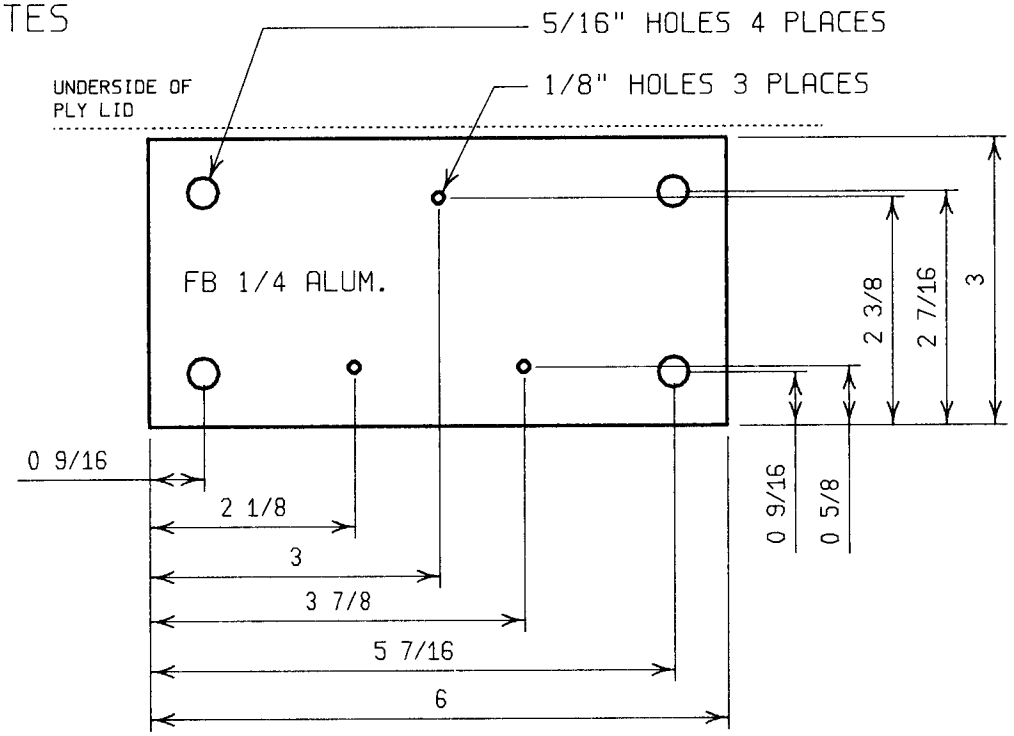
POOR PATTERN
DOES NOT OFFER CROSS NAILING.



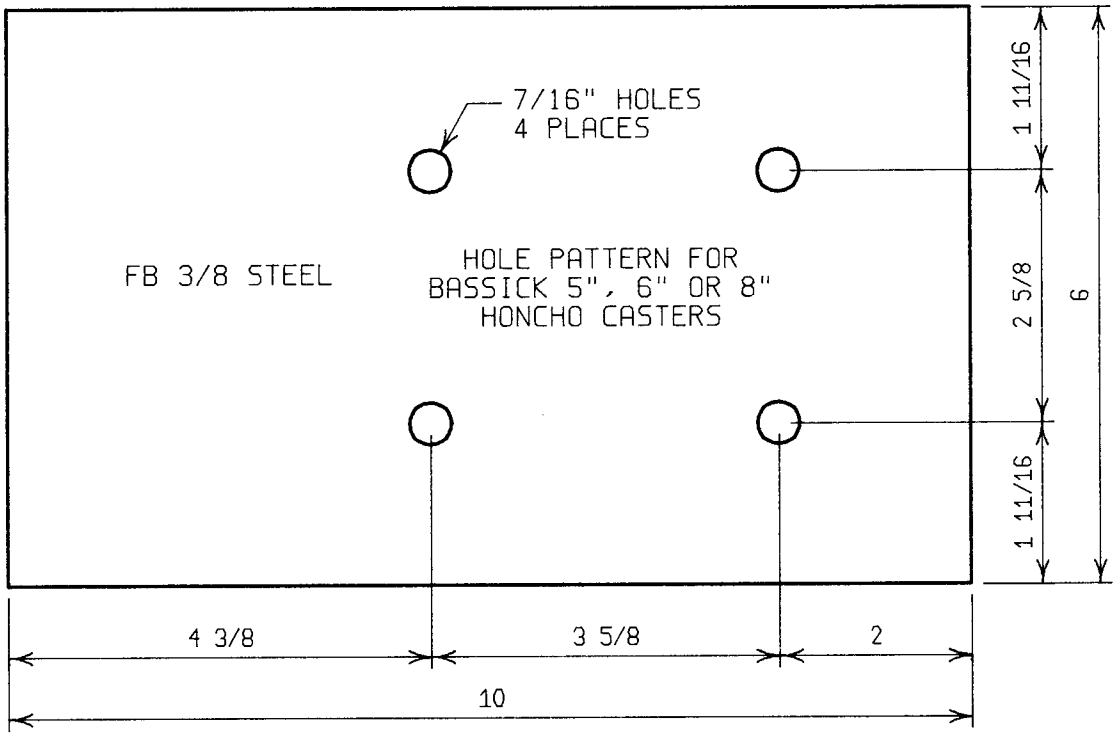
A NAILING BLOCK IS USED TO INCREASE THE STRENGTH OF A JOINT. THE "BEST" AND "GOOD" PATTERNS ABOVE OFFER CROSS NAILING AND THE POSITIONS OF THE BLOCKS RESIST TWIST. THE "POOR" PATTERN DOES NOT OFFER CROSS NAILING THEREFORE THE ENTIRE STRENGTH OF THE JOINT DEPENDS ON THE NAILS RESISTANCE TO LATERAL AND SHEAR FORCES. A NAILING BLOCK SHOULD BE POSITIONED TO USE THE FACE GRAIN AND EDGE GRAIN OF THE BLOCK. DO NOT USE THE END GRAIN. (WHEN NAILING BLOCKS ARE NOT USED THE NAILS SHOULD BE REPLACED BY SCREWS.)

STANDARDS

PLATES



RENTAL LEG POCKET PLATE



CASTER PLATE FOR SCENERY DOLLIES